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NEW PALMS OF BAHIA*

BY GREGORIO BONDAR

Cocos vagans Bondar, sp. nov. Boletim 4, Inst. Centr. Fom. Econ. Bahia (1939) pp. 10-12, figs. 5-7, 12 (without latin diagnosis).

Caudex horizontale inclinatus, subterraneus, cum basibus persistentibus foliarum squamosus, asperus, sub terram ramificans. Foliae subconcinnae, strictae, 3 m. longae, 20-30 in gregibus aggregatae. Foliolae lineares, angulos acutos cum rachite formantes. Spatha erecta, plus minusve 1 m. longa, fusiformis, compressa, acuminata, pedunculo elliptico, gracili, rachite 30-40 cm. longa, ramis exsertis 30-40 cm. longis. Flores femininae globosi-pyramidales, sepalis coriaceis breviapiculatis, petalis minoribus membranaceis, ovaria conica, stigmatibus confluentibus. Flores masculinae brevipedunculatae, calyce minuto, sepalis triangularibus et carinatis, petalis lanceolatis apice obtusis, antheris ad extremitates bifidis in filamentum breve medio insertis. Drupa elongata, 3.5×1.8 cm., acuminata, bracteis sepalisque petalisque persistentibus, androecio 6-dentato, abortivo, exocarpio in maturitate luteoviridi, putamine ad extremitates conico, endocarpio osseo, papyraceo, fragili, interiore cum 3 vittis fuscis nitidis delineato. Semen leve, album.

This apparently acaulous palm of the caatingas of the interior of Bahia, at 300-400 m. above sea level, is abundant in the municipios

* Since the palms constitute such an important element of the flora of Brazil, it should be a matter of satisfaction to Brazilians that once more, for the first time since the days of Barbosa Rodrigues, these palms are being studied in the field, as they should be, and are being described not in the Old World but in Brazil. Many numbers of the recent publications of Instituto Central de Fomento Econômico da Bahia, 1939 to 1941, are thus devoted to palms. All of them are from the pen of Dr. Gregorio Bondar, long a resident of Bahia and known not only for his work on cacao in Brazil but also for his many entomological contributions. Several Bondar publications on palms are reviewed in Tropical Woods, No. 69 (1942): Boletim No. 2 (1938), O Licuriseiro (*Cocos coronata* Mart.) e suas possibilidades na economia brasileira; Boletim No. 4 (1939), Palmeiras na Bahia do Genero Cocos; Boletim No. 5 (1939), Importancia economica das palmeiras nativas do genero Cocos nas zonas secas do interior bahiano; Boletim No. 6 (1939), Palmeiras da Bahia; Boletim No. 9 (1941), Palmeiras do Genero Cocos e descrição de duas especies novas. All of these, as well as a later paper, probably still unpublished, on the *Attalea* palms of Bahia, testify to the keen observation and critical sense of their author, his grasp of his subject, and intimate acquaintance with the plants of which he writes.

As may be inferred from some of the above titles, Dr. Bondar does not accept Beccari's generally unchallenged treatment of the genus *Cocos*, with its many

of S. Ignez, Maracás, S. Teresinha, etc., covering great stretches, generally in association with *C. coronata* Mart., or forming isolated patches. Vernacular name "ariri," but also called "licurioba."

Leaves are subconcinnae; drupes at maturity greenish yellow; endocarp smooth, thin and readily broken; seeds 2.4 cm. long, 1 cm. in diameter, white, oily, covered by a white pellicle, externally reddish, of bitter taste.

The species approaches most closely to *Cocos petrea* Mart. from which it differs principally in its branched spadices, whitish tomentum of leaves and fruit, and smaller staminate flowers. Coll. G. Bondar (isotype Field Museum 619777).

Cocos Tostana Bondar, sp. nov. Op. cit. pp. 13-15, figs. 8, 9, 12, (without latin diagnosis).

Caudex erectus, mediocris. Foliae rigidae, erectae, non curvatae, 2.5-3 m. longae, petiolis quam foliis $\frac{1}{2}$ longioribus, spinas marginales ad basem petiolae longas superiore curtas atque inclinatatas ferentibus, parte suprema glabra. Foliolae lineares, acuminatae, ad basem foliae subaggregatae in duo planibus ad 15° divaricatae, superne in una plana equidistantes. Spadix 1.3-1.4 m. longa, rachite ramosa 50-60 cm. longa, ramis numerosis, angularibus, nodosis. Flores feminae conicae, sessiles. Flores masculinae in scrobiculis, pedicellis 1 mm. longis, antheris linearibus basim sagittatis, ad tertium basalem in filamentum insertis. Drupa ante maturitatem obovoidea 4 cm. \times 2.6 cm., aurantiaco-rubra in maturitate, globosa, succulenta, pulpa fibrosa, putamine elongato externe fibroso ad extremitates acuto, endocarpio crasso, ad extremitates crassiore, interne levi, 3-vittato. Semen solidum, albumine uniformi.

segregations, considered by him artificial and founded only on the study of the kind of fragmentary material by which the palms are represented in almost all herbaria. A new revision of *Cocos* at his hands would be quite in order; but for the present at least, Dr. Bondar prefers to confine his publications to species of which he has gained a thorough knowledge by adequate personal observations in the field. In this connection it is of interest to remark that some of the species he describes were studied by him, sometimes primarily and originally, as host plants of particulate insect inhabitants. It is, however, to be expected that his ideas on the subject of *Cocos* may be developed and set forth by him eventually as opportunities for further field observations are afforded. In the meantime new species of *Cocos* described by him will doubtless be transferred promptly by other authors to *Syagrus* or other customary segregate genera.

Type material of Dr. Bondar's new species has been deposited in the herbarium of Field Museum. It therefore seems appropriate that the latin diagnoses of new species required by the international rules since Jan. 1, 1935, but not included with his detailed descriptions in portuguese, be published without further delay. In view of the fact that Dr. Bondar's name now appears on the list of the scientific staff of Field Museum as Research Associate, it is a pleasure to be able to record these new species in the Museum's Botanical Series.—B. E. DAHLGREN

This palm is rare in Bahia. It is characterized by its stem of medium size, 2–3 meters high and 10 to 15 cm. in diameter, bearing stiff erect leaves; by its persistent petioles not in distinct spirals; by the orange-red color of its fruit when ripe; and by its thick endocarp and nonruminant albumen. Vernacular name “licurioba-ussú.”

Its habitat is near the littoral, not far from the city of Bahia with *C. coronata* Mart. and *C. schizophylla* Mart. It is apparently intermediate between these. It differs from *C. coronata* in its green, not grayish, leaves with segments but little divaricate at base, the apical ones in one plane, and the cavity of the endocarp marked by three bands (in *C. coronata* there is usually one). It differs from *S. schizophylla* in its larger size, its erect leaves with broader and clasping bases of the petioles, and its oblique spines diminishing upward, finally disappearing and leaving a smooth-edged interval below the rachis. Its spadix is more robust, its staminate flowers larger. The filaments attached at the basal third (in *C. schizophylla* at the middle), the albumen smooth (in *C. schizophylla* ruminant). Coll. G. Bondar (isotype Field Museum 619775).

Cocos Matafome Bondar, sp. nov. Op. cit. pp. 16–18, figs. 10–12 (without latin diagnosis).

Caudex erectus, *C. coronata* Mart. simulans. Foliae erectae, ad 3 mm. longae, petiolis persistentibus quam foliis $\frac{1}{2}$ longioribus, non in cristis distinctis dispositis. Foliolae in gregibus de 2–5 aggregatae, luteo-virides, fragiles. Spadix ad 2 m. longa, pedunculo ad 1.2 m. longo, rachite sulcata, ramis numerosis plus minusve 60, ad 50 cm. longis. Flores feminae sepalis obtusis imbricatis involventes, petalis minoribus acuminatis. Flores masculinae petalis lanceolatis obtuse acuminatis involventes, antheris ad tertiam basalem insertis. Drupa elongata, in maturitate luteo-viridi, putamine elongato, acuminato, fibroso, interne 3-vittato. Semen leve, cavum, ante maturitatem amarum.

The vernacular name is “matafome”, referring to the edible qualities of its kernels. This palm was found in the interior of Bahia in the Municipio of S. Teresinha near Lagedo Alto, growing singly or in groups in association with *C. vagans* Bondar and *C. coronata* Mart. It appears to be intermediate between these. It has the trunk characters of the latter, but not its spiral arrangement of leaves. It resembles *C. vagans* in leaves, inflorescences, drupes, and kernels, but also differs in respect to all these characters. It cannot

be considered a variety of *C. coronata*, because it is closer to *C. vagans* from which it differs essentially in its erect trunk, also in its fibrous putamen. Its leaves are green, not grayish as in *C. coronata*; its leaf-segments are less stiff and more fragile. The endocarp differs from that of *C. coronata* in having the cavity marked with three bands, instead of one as in the latter. Coll. G. Bondar (isotype Field Museum 619770).

Cocos Campos-Portoana Bondar, sp. nov. Bol. 6, Inst. Centr. Fom. Econ. Bahia (1939) pp. 7-9, figs. 2, 3, 6 (without latin diagnosis).

Caudex erectus, robustus, annulatus. Foliae erecto-incurvae, robustae, crispae, petiolis persistentibus in spira pentasticha dispositis. Foliolae lineares, asymmetrico-acuminatae, forte divaricatae, 5-6 in gregibus. Spadices grandes, 2-2.4 m. longae, rachite longi- et multi-ramosa, ramis exsertae, usque ad 80 cm. longis. Flores femininae sepalis involventes, petalis minoribus subtridentatis, androecio abortivo, annulato, marginibus levibus. Florum masculinarum calyces minusculae gamosepalae, petalis lanceolatis obtuso-acuminatis, antheris non bifurcatis. Drupa subglobosa, 3.2×3 cm. lata, in maturitate luteo-pallido-viridis, pulpa fibrosa, gummosa, esculenta, endocarpio elongato, osseo, crasso, intus monovittato, levi. Semen leve, 11 mm. × 10 mm. latum, apice conica.

This palm was found at fazenda Gangugy on the upper Rio Gungugy, municipio de Poções, at an elevation of 300-400 meters, in the state of Bahia. Local name, "licuri-assú."

It differs from *C. Romanzoffiana* Cham. in its persistent petioles in five rows, its larger fruit, and its thicker endocarp with smooth cavity; from *C. coronata* Mart. in its much more imposing size, its much larger spadices, its large male flowers, and its thick endocarp. Coll. G. Bondar (isotype Field Museum 619765).

Attalea Burretiana Bondar, sp. nov.—Caudex plus que 10 m. altus levis, foliis erectis circa 10 m. longis patentibus, ad apicem recurvatis et in angulo 90° tortis, foliolis suboppositis aequidistantibus in una plana directis, non pendentibus. Flores masculinae in scrobiculo parvo binae, petalis 16-18 mm. longis lanceolatis acuminatis, marginibus levibus vel vix irregulari-denticulatis, staminibus 6-7, 8-9 m. longis. Spadix androgynus ad 2 m. longus, pedunculo et rachite glabra, ramis numerosis, floribus 1-4, bracteis 4 (2 parvis et abortivis, 2 grandis), sepalis et petalis subaequalibus marginibus levibus, disco androecio circulari margini levi vix sinuoso

haud dentato. Drupa ovoidea ochraceo-ferruginea 8–10 cm. longa diametro 5.5–6 cm. ad apice acuminata, exocarpio fibroso tenui (ad 1.5 mm. crasso), mesocarpio pulposo 3–4 mm. crasso, endocarpio 8–10 mm. crasso externe fibroso interne ad 5–6 mm. osseo, putamine rostrato basin triangulari, seminibus 1–3.

Differs from *A. compta* Mart.¹ in number of stamens, from *A. oleifera* Barb. Rodr. in number of seeds, non-tomentose rachis, and non-dentate petals of female flowers, and from *A. funifera* Mart. in flowers, drupes, and regularly spaced leaf-segments.

Named in honor of Professor M. Burret, Berlin-Dahlem, who called my attention to this palm.

Bahia, municipios adjacent to the capital, altitudes of 10 to 100 meters, in association with *A. Piassabossu* Bondar. A majestic ornamental palm, fruiting only after developing a trunk. Local name "palmeira". Municipio da Bahia, Aratú, coll. G. Bondar (isotype Field Museum 619754).

Attalea concentrista Bondar, sp. nov.—Caudex altus, foliis grandis erectis patentibus, foliolis suboppositis equidistantibus in una plana dispositis, petiolo et rachite dorsale dealbata. Spadicis masculini pedunculus et rachis cinereo-tomentosa, ramis albis tomentosis, floribus solitariis in scrobiculis, petalis 20–21 mm. longis, staminibus 6, quam petalis $\frac{2}{3}$ (semper plus que $\frac{1}{2}$) longioribus. Spadicis androgyni pedunculus et rachis luteo-albidus levis, florum foeminarum marginibus bractearum et sepalorum et petalorum levibus haud dentatis, cupula androecii circulari marginibus edentatis, $\frac{2}{3}$ ovariam includenta. Drupa oblonga umbonata ochraceo-ferruginea scabra 9 cm. longa, diametro 5.5–6 cm., perianthio $\frac{1}{3}$ drupae altitudine alto, seminibus 1–3.

Approaches *A. compta* Mart., differing in number of stamens. Differs from *A. oleifera* Barb. Rodr. in that the petals of female flowers are not dentate, the androecial disk is circular, the petals

¹ Of the thirteen species of *Attalea* remaining since Burret's revision of this genus in 1929, three are known to exist in Bahia, *A. funifera* Mart., *A. compta* Mart. and *A. humilis* Mart., all inhabiting the littoral zone. To these should possibly be added *A. oleifera* Barb. Rodr. as existing on the Rio São Francisco. The rather recently described *A. acaulis* Burret, growing in dune formations in the vicinity of the capital, must doubtless be considered as a somewhat depauperate form of the well-known "piassabeira" or piassaba palm, *A. funifera*, which in poor soil fails to form a trunk. There exist, however, several other large and tall-stemmed palms of this genus, sufficiently distinct to have local vernacular designations, "andaia", "piassabossú", "palmeira" and "pindobassu". I have treated of these at some length in a still unpublished paper presented before the botanical section of a recent Geographical Congress in Brazil, but there without the formal latin diagnoses. G. BONDAR

of the male flowers are larger; from *A. Burretiana* Bondar in that the male flowers are smaller and are solitary in scrobiculi, the androecium is larger and encloses $\frac{2}{3}$ of ovary.

State of Bahia, municipios de S. Antonio de Jesus, Amargosa, Areia, S. Ignez, at altitudes of 200–400 m. Local name “andaia”. Leaves used for thatch, the fruit for food, the seeds for oil extraction. Coll. G. Bondar (isotype Field Museum 619759).

Attalea Piassabossu Bondar sp. nov.—Caudex circa 10 m. altus, foliis grandis circa 10 m. longis erectis, petiolis persistentibus fibros duos divergentes marginales ferentibus, vaginis foliolarum fibros (“piassava”) crassos duos ferentibus, foliolis 1 m. longis suboppositis, 6 cm. latis, aequidistantibus saepe flaccidis, lateris foliae angulo 160° divergentibus. Spadix masculinus 1.8–2 m. longus, pedunculo 0.8–1 m. longo, ferrugineo-tomentoso subcylindraceo, rachite alba scabra non tomentosa nodosa, ramis basin crassis; floribus basalibus grandis sparsis, in scrobiculis binis, floribus superioribus solitariis et coactatis; petalis 25–30 mm. longis lanceolati-acuminatis medio latissimis, marginibus levibus; staminibus florum basium 7, florum apicalium 6, 10–11 mm. longis. Spadix androgynus 2 m. longus, floribus foemininis albellis grandis 3 (una abortiva 2 m. longa, duo 6–7 mm. longis), sepalis apice rotundis marginibus levibus; androecio cupulari, margine levi vix sinuoso haud dentato. Drupa ferruginea oblonga, obtuse-acuminata, 9 cm. longa diametro 5.5–6 cm., perianthio $\frac{1}{4}$ drupae altitudine alto, petalis apiculatis; exocarpio fibroso 1.5–2 mm. crasso, mesocarpio 5–6 mm. crasso, endocarpio duro 8–10 mm. crasso; seminibus 1–3, putamine oblongo transverse circulari vix fibroso.

Differs from *A. compta* Mart. in size of flowers and number of stamens, from *A. funifera* Mart. in its simply pectinate leaves which are not plumose, with segments not in groups, and in its thick piassava fiber and different flowers; from *A. Burretiana* Bondar in its less recurved leaves, its larger flowers and drupes.

Bahia, municipios adjacent to capital, where it grows in association with *A. Burretiana* on soils of gneissic-primary origin and with *A. funifera* on tertiary soil. Vernacular name “piassabossú”. The leaves are employed for thatch; the kernels are edible and used for oil. Municipio de Bahia, Alegre, coll. G. Bondar (isotype Field Museum 619762).

Attalea Pindobassu Bondar, sp. nov.—Caudex ad 15 m. altus levis nonnumquam partim inaequalis atque nodosus, petiolis 2–3 m.

longis persistentibus, foliis ad 12 m. longis erectis atroviridibus, petiolo et rachite dorsale ferrugineo-tomentosa, superiore atroviridi, foliolis 60–70 cm. longis, 3.5–4.5 cm. latis, suboppositis 5–6 mm. in eadem plana aequidistantibus nonnihil pendulis, lateris foliae angulo 180° divergentibus. Spadicis masculini pedunculus 1 m. longus subcylindraceus tomentoso-ferrugineus, rachite albotomentosa, floribus 16–18 mm. longis, 6–7 mm. latis, in scrobiculis solitariis alternatim et lateraliter dispositis, petalis imbricatis lato-lanceolatis incurvatis apiculatis, marginibus irregularibus minute serratis, staminibus 12 (raro 11) $\frac{2}{3}$ longitudinem floris attingentibus. Spadicis androgyni flores foemininae albellae, bracteis 3 (1 parvo abortivo, 2 majoribus), sepalis imbricatis vix apiculatis, marginibus levibus, petalis apiculatis marginibus levibus, disco cupulari margine levi. Drupa ferrugineo-tomentosa oblonga apiculata rostrata 8–9 cm. longa, diametro 4.5–5 cm., perianthio $\frac{1}{3}$ – $\frac{1}{2}$ drupae altitudine alto, disco androecio diametro 3 cm. lato margine levi, exocarpio duro ligneo fibroso 4–5 mm. crasso, mesocarpio pulposo albo oleagineo 1.5 mm. crasso, endocarpio osseo 6–8 mm. crasso, putamine 7 cm. longo rostrato, seminibus 1–3 raro 4–5.

Differs from other *Attaleas* of Bahia in number of stamens (12), a number most nearly approached in *A. compta* Mart. (with 10 to 12). It differs from the latter in having longer male flowers and drupes covered to greater extent by perianth.

Bahia, center of state, municipios de Campo Formoso, Saúde, Jacobina, Miguel Calmon, at altitudes of 400–700 meters. The tree fruits after forming a trunk of 2–3 m. Old leaf stalks are long persistent. Vernacular name “pindobassú”. Serra de Ouro, coll. G. Bondar (isotype Field Museum 619761).



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